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EP-A- 0 305 219
DE-A- 3 042 042
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US-A- 3 844 876
US-A- 3 869 831
US-A- 4 740 256

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Description

This invention relates to the production of articles from plastic foam and in particular to the production of foam articles having curved surfaces which may bear a coating of functional or decorative utility.

The most common form of foam production is to form webs or blocks of foam which may have a wide range of widths and thicknesses. Shaped foam articles may be fabricated from the foam webs by cutting, folding, compressing or adhering one or more sections of foam web. Shaped foam articles may also be produced by forming the foam in situ in a mold. However, these techniques are not practical for the commercial production of elongate strips, particularly those having a length of several meters or more.

Foam articles having curved surfaces have been produced by cutting or sculpturing a foam web or block. They have also been produced by shaping a first foam web by folding or compression (e.g., in a mold) and adhering a second foam web or other substrate to the shaped foam, thereby preventing the shaped foam from returning to its original form. The adhering step can be carried out using an adhesive or welding, e.g., by application of heat or ultrasonics. An example of such a shaping technique is disclosed in U.S. Pat. No. 4,740,256 which discloses a process for making elongate weather strips.

U.S. Patent No. 3,123,686 discloses a method for finish shaping foamed plastic into rod-like strips, which are dimensionally accurate and uniform in cross-section, by heat shrinking the raw material to finished size in a forming die wherein the strips are momentarily heated, increment by increment and without the application of pressure, thereby maintaining the characteristics of its outer skin-like surface and its closed cellular structure.

U.S. Patent No. 3,869,831 discloses a process in which sheet foam (usually synthetic, flexible, foam plastic) is cut into a plurality of strands of uniform cross-sectional dimensions in a two stage operation by securing the sheet foam to a backing roller by a first pair of spaced apart holding or pinching rollers and a first cutter mounted between the first holding rollers to cut part way through the sheet, and then securing the partially cut sheet to a second backing roller by a second pair of spaced apart holding rollers with a second cutter roller cutting the opposite or uncut side of the sheet between the second holding rollers.

Some foams may be "cold welded". Cold welding occurs when a foam fuses if cut or sheared under pressure. For example, cosmetic pads have been stamped from a thin foam web using a cutter having a blunt edge. During the stamping operation a weld is formed where the foam is compressed, resulting in a weld d seam.

It has been found that cold welding using blunt rotary cutters may be utilized to fabricate from foam webs and blocks a wide range of longate shaped articles of any desired length.

According to one aspect of the invention there is provided a foam article in the form of an elongate strip comprising a curved surface in which the strip is formed of a cold-weldable foam and has at least one cold welded seam along its longitudinal length which maintains the configuration of the curved surface. In this fashion, elongate circular cords of remarkable circular symmetry can be formed from flat foam web.

According to another aspect of the invention there is provided an array of adjacent elongate parallel foam strips, each strip comprising a curved surface and the individual strips being manually separable from the array, in which adjacent strips are joined to each other by longitudinal welded seams that maintain the curvatures of the surfaces. In this latter embodiment of the invention, cold welding is a preferred technique for forming the weld seams, but is not required.

The invention also provides methods for producing the above mentioned foam article and array. In a method according to the invention of producing a foam article in the form of an elongate strip which comprises a curved surface, a predetermined area of an elongate web of foam is compressed and optionally cut with a blunt edge under pressure such that a welded seam is formed during the cutting operation which fuses opposing surfaces of the web to each other at the region of the seam, thereby providing a curved surface.

It has been found that it is readily possible to fabricate foam cords having a variety of curved cross-sections and any desired length from a foam web by longitudinally cold welding the web to form one or more elongate weld seams. A single cold welding operation will result in a strip having a curved surface on one side e.g. the strip may be semi-circular in cross-section. The use of two parallel cold welding operations will result in a strip having curved surfaces on either side which may result in a strip having an oval or circular cross-section depending upon the spacing between the welded seams. The cold welding step may readily be performed using a rotary cutter having a blunt cutting edge which is applied to the web under pressure whilst the region of the web being cut is supported on a hard surface e.g. a steel roller. Foam cord of circular cross-section may be produced by a pair or rotary cutters arranged in parallel acting on a common steel roller and feeding a foam web through the parallel cutters. An array of such cords can be produced using three or more

cutters. The method of the invention is simple and efficient, forming and optionally slitting th shapes simultaneously without requiring the use of moulds.

Embodiments of the invention will now be described by way of example and with refer nce to the accompanying drawings wherein:

Figs. 1A to 1C illustrate cross-sectional views of the production of separated cylindrical foam cords in accordance with a first embodiment of the invention;

Fig. 2 represents a cross-section through an elongate foam abrasive strip in accordance with a second embodiment of the invention;

Fig. 3 represents a cross-section through an elongate abrasive block having a tapered edge in accordance with a third embodiment of the invention;

Fig. 4 represents a perspective view of a packaging system (with the package sidewall partially broken away) for an array of parallel, joined foam cords in accordance with a fourth embodiment of the invention;

Fig. 5 represents a fragmentary side view of the packaging system of Fig. 4; and

Fig. 6 represents a fragmentary end view of the packaging system of Fig. 4.

Referring to Figs. 1A to 1C, foam web 2 bearing a pressure sensitive adhesive coating 4 is shown in Fig. 1A in an uncompressed state, in Fig 1B in a compressed state during welding, and in Fig 1C in the welded state. Figs 1A to 1C are all crossweb sectional views. In other words, each view is perpendicular to the longitudinal or elongate direction in which the foam web would conveniently be handled in roll form using conventional winding and unwinding equipment. Referring to Fig. 1B, web 2 is passed through a pair of rotary cutters 6, 8 (shown diagramatically) which have blunt cutting edges 10, 12. Because the rotary cutters need not actually cut the foam web, they could be called "rollers" rather than "cutters". However, because they are conveniently fabricated from rotary cutting blades that have lost their cutting edge (or deliberately had the edge dulled), the term "cutters" will be used for purposes of explaining the invention. Rotary cutters 6, 8 are urged towards a hard surface 14, conveniently in the form of a metal roller. The metal roller may be driven and the rotary cutters free to rotate thereby allowing long continuous webs to be processed. The cutters 6, 8 bear against hard surface 14 with a force sufficient to achieve cold welding of the web 2. The foam web may be compress d on either side of the cutters with a spacer (not shown) to reduce friction between the sides of the cutter and the foam.

Referring to Fig. 1C, after separation and elastic relaxation the individual strips are in the form of a foam cord 15 having a circular cross-section. Semi-circular surfaces 15a and 15b are flanked by longitudinal welded seams 16 and 18. The density of the foam is low (approximately that of the uncompress d web 2) near the center of cord 15, and increases in the region of welded seams 16 and 18. The cord may conveniently be wound on itself or on a core (not shown). The cord optionally bears a release coating (not shown), e.g., a silicone or fluorocarbon coating on its underside to facilitate unwinding. Foam cord 15 is useful as a sealing strip, packaging material or masking material, e.g., to fill gaps between a car door and car body prior to paint refinishing.

Fig. 2 illustrates a cross-section through an elongate foam abrasive strip 19 formed from a foam web 20 bearing an abrasive coating 22 on curved surface 19a and a double-sided adhesive tape 23 (having adhesive layers 24 and 26, and substrate 28) on flat surface 19b. Welded seams 30a and 30b were formed using a blunt rotary cutter. Because the substrate 28 is stiffer (less flexible) than foam web 20, surface 19b is substantially flat or planar after welding. Abrasive coating 22 is flexible and permits upper surface 19b to adopt a curved configuration after welding. The foam is compressed in the region of longitudinal welded seams 30a and 30b. Adhesive layer 26 can be covered with a release liner (not shown) to facilitate storage of strip 19 before use. Strip 19 may readily be attached via adhesive layer 26 to a power tool (for example, an air file, not shown) for sanding, grinding, etc.

Fig. 3 illustrates in cross-section a portion of an elongate abrasive block 32 prepared in accordance with the invention. Block 32 is formed from foam web 33 having abrasive coatings 34, 36 on its major surfaces. One or more edges of the block are be formed by cold welding web 33 to form a cold weld seam 38 providing a curved abrasive surface near the edge of the block.

Referring to Figs. 4 to 6, an array 42 of parallel foam strips 44 joined via the welded seams 46 is wound on a core 48 which is supported for rotation within a carton 50. The carton is conveniently made of corrugated cardboard. The carton has a flap 52 to provide ready access to the contents. The exposed end 54 of each foam cord is temporarily secured to the array by an adhesive tape 56 which may conveniently be provided with a tab 58 to facilitate removal. When it is desired to dispense a foam strip, the adhesive tape is removed and the exposed end of the strip pulled, which causes sh aring of the seam separating the strip from the remainder of the array and rotation of the wound array. The remainder of the array remains neatly stored on the roll. If desired it is possible to dispense a composite of two or more strips joined to each other by pulling the ends of those strips

simultaneously.

The invention can be further understood from the following detailed discussion. For example, when making the cold-welded elongate foam strips of the invention, a predetermined area of an longate foam web is longitudinally compressed using a blunt rotary cutter. This is conveniently carried out by moving the web between the cutter and a roller. In order to carry out cold welding, the web should be compressed under sufficient pressure so that an elongate welded seam fuses opposing surfaces of the web to each other, thereby permanently de forming the web and providing a curved surface adjacent the weld. If it is desired to produce individual, separated foam strips, then the cutter force can be kept sufficiently high to shear the strips apart at the weld lines during the cold-welding step. The strips can also be pulled apart laterally (i.e., automatically) downweb from the cold welding step, or a separate slitting blade can be employed to separate the strips. When it is desired to produce an array of separable foam strips, then the cutter force should be kept sufficiently low to prevent undesired separation of the strips at the weld lines, but sufficiently high to achieve thorough cold welding and permit easy manual separation of the strips. As a general guide, webs having a thickness of about 14 to 25 mm may be processed into an array of manually separable foam strips by using cutters having a blunt edge that is about 0.5 to 1.5 mm thick, and applying a cutter downforce of about 136 to 159 kg per pair of cutters.

In this fashion, one can fabricate foam cords having a variety of curved surfaces and any desired length from cold-weldable foam web. A single cold welding operation will result in a web having a curved surface near the weld and opposing flat surfaces remote from the weld. The use of two parallel cold welding operations will result in a strip having curved surfaces near each weld, and a strip having an oval or circular cross-section depending upon the spacing between the welds. The method of the invention is simple and efficient, and permits forming and slitting the shapes simultaneously without requiring the use of molds.

Polyester foam is preferred for use in the cold welded embodiments of the invention. The foam preferably has a density of about 26 kg/m^3. A preferred cold-weldable foam is commercially available from Caligen Foam Limited under the trade designation "grade 4273A".

It has also been found that the rotary cold welding technique will work effectiv ly with coated foam webs. Treating flat webs of material to provide a uniform coating is a straightforward operation that can be carried out with many types of suitable apparatus, e.g., by spraying, brushing, rolling, knife coating, etc. Coating, particularly partial coating, of articles already having a curved surface requires more sophisticated techniques. The invention permits simpl manufacture of shaped foam articles that are partially or fully coated on their curved surfaces by coating the desired area of a flat foam web and then cold welding the web to form the shaped article.

Suitable coating materials should be capable of adhering to the foam and include adhesives, e.g., pressure sensitive adhesives, and binders, e.g., cross-linking polymers, optionally incorporating pigments or abrasives, e.g., silicon carbide and aluminum oxide. As noted above, the coating may also be in the form of a substrate bonded to the foam web, the substrate having a lower degree of flexibility or elasticity than the foam. Such a substrate produces a flatter surface after cold welding than would be formed by the foam in the absence of the substrate.

Foam strips or cords of the invention having a circular or elliptical cross-section will find particular utility as a masking material in vehicle body workshops. The strip is used to fill gaps between a door and frame, bonnet and frame, boot lid and frame, etc., prior to paint spraying. The strip is preferably partially coated with a pressure-sensitive adhesive to hold it in the desired position and allow ready removal after use. The foam is preferably an open cell foam since this allows efficient absorption of paint and enables a feather edge to be attained.

It will readily be appreciated that a wide variety of elongate shapes may be produced by the method described above. For example, conical surfaces may be obtained by cold welding the web along two convergent lines, using rotating blunt cutting wheels arranged in a v-shaped configuration. For purposes of explanation, these convergent weld lines will be regarded as "longitudinal", since they lie substantially in the web processing direction and can be formed using rotary cutters. Such conical shapes may have abrasive surfaces for grinding and cleaning purposes or be dimensioned for uses as ear plugs and the like.

As noted above, the invention also includes an array of foam strips joined to each other by longitudinal welds, the strips being manually separable from one another. Such an array can readily be formed into a roll, e.g., by winding on a core, and individual strips may readily be separated since the compressed weld foam material shears easily between the adjacent strips. Thus, packaging the foam strip in the form of an array is simplified compared to winding and packaging individual strips. Also, large amounts of foam strips are often required for masking purposes in a vehicle body shop, and it is convenient to supply the strips in robust, stable boxes containing the desired length of strips in readily dispensable form. It has been

found that an array of at least 4 joined strips, e.g., 4 to 10 joined strips, wound on a spindle or core and supported within a carton is particularly suitable. The exposed ends of one or more of the strips are preferably secured to the underlying layer, e.g., with adhesive tape. By pulling the strip (or strips) to be dispensed, the strip will unwind and simultaneously shear from the array.

As noted above, the array of foam strips or cords may be prepared from a flat foam web by compressing the web along a series of parallel lines and welding the compressed foam. The compressed foam may be welded ultrasonically, by heating or by cold welding. The compression and welding steps form a longitudinal weld of two or more adjacent foam strips and the strips are joined together by material forming the weld.

Arrays of the invention are most conveniently formed by cold welding, e.g., by passing a foam web through three or more parallel rotary cutters which may be mounted on a common axis and acting on a hard surface, the cutters being arranged to compress and cold weld the foam without completely shearing the web. The strips in the resulting array are joined by a thin section of compressed welded foam. These sections will readily shear if lateral force is applied and care must be taken to avoid such lateral forces when winding and packaging the array.

Any suitable compressible foam which may be welded may be employed to form the arrays of the invention. The foams may be open or closed cell foams and may have a wide range of lengths, thicknesses and widths. Suitable types of foam are disclosed in "Foamed Plastics', Kirk-Othmer Enc. of Chem. Tech., 3rd Ed. Vol. 11, pp. 82-126 (1980) and include polystyrene, polyvinylchloride, polyethylene, polyurethane, polyisocyanate, polyphenol, polyester and silicone foams. Foams having a density of about 20 to 30 kg/m^3 are generally useful. The selection of foam material depends upon the fabrication method for forming the array and the intended use of the articles or strips.

As with the individual foam cords of the invention, an array of parallel, joined cords or strips may be formed from a coated or uncoated foam web. If the cord is required to have an adhesive over part of its surface the adhesive may be applied over an entire surface of the foam web prior to welding, or in bands between the areas which are to be welded. The web area that is coated prior to welding may affect the profile of the curved surface produced after welding and the thickness of the adhesive bands may be varied to achiev the desired profile. Alternatively, the adhesive may be applied to a surface of the array of parallel, joined cords after the longitudinal welds have been formed, but this is typically less convenient than adhesive application prior to welding.

The foam strips forming the array do not require the presence of a polymeric film extending between the longitudinal welds to maintain the curved profile of each strip. The presence of such a polymeric film may prevent manual separation of the strips of the array unless the polymeric film is treated to provide lines of weakness e.g., scoring, partial slitting, perforating, etc., to facilitate tearing of the polymeric film between the strips. Moreover, the presence of such a polymeric film is undesirable for masking purposes since it can inhibit capture and absorbance of paint droplets by the foam.

It will be appreciated the individual foam cords of the array need not have a circular cross-section, depending upon the spacing of the welds. Also, it is readily possible to form cord arrays of different dimensions by variation of thickness of the web and the distance between adjacent welds in the web.

Claims

1. A foam article in the form of an elongate strip comprising a curved surface, characterized in that the strip is formed of a cold-weldable foam and has at least one cold welded seam along its longitudinal length which maintains the configuration of the curved surface.

2. An article as claimed in Claim 1, further characterized in that the article comprises a pair of welded seams, has an oval or circular cross-section, has a density that increases near the weld seams, and has a length of more than one meter.

3. An article as claimed in any preceding claim further characterized in that the strip is at least partially coated with a layer of adhesive.

4. An article as claimed in any preceding claim, further characterized in that the strip is an open cell foam in the form of a paint masking gasket whose length and diameter are suitable for disposition of the strip between a vehicle door and a vehicle body.

5. An article as claimed in Claim 1, further characterized in that the article comprises a pair of welded seams inclined towards each other, the strip having a generally conical surface.

6. An article as claimed in Claim 5, further characterized in that the strip is in the form of an ear plug.

7. An array of adjacent elongate parallel foam strips, each strip comprising a curved surface and the individual strips being manually separable from the array, characterized in that adjacent strips are joined to each other by longitudinal welded seams that maintain the curvatures of the surfaces.

8. An array as claimed in Claim 7, further characterized in that at least a portion of the surface of each strip is coated with a pressure sensitive adhesive.

9. An array as claimed in Claims 7 or 8, further characterized in that the foam is an open cell foam and is cold-weldable.

10. An array as claimed in any of Claims 7 to 9, further characterized by having a length of at least one meter, the array being wound in roll form.

11. A foam article having a curved surface characterized in that the foam is a cold weldable foam, the curved surface is maintained under compression by a cold welded seam, and the article is at least partially coated with a surface layer.

12. A foam article as claimed in Claim 11, further characterized in that the article is an open cell foam in the form of an elongate pad or block.

13. A foam article as claimed in Claims 11 or 12, further characterized in that the surface layer comprises a pressure sensitive adhesive.

14. A foam article as claimed in any of Claims 11 to 13, further characterized in that the surface layer comprises abrasive particles and a binder.

15. A foam article as claimed in Claim 14, further characterized in that a portion of the surface of the article is coated with an abrasive layer and an opposing surface is coated with a pressure sensitive adhesive.

16. A method of producing a foam article in the form of an elongate strip comprising a curved surface, characterized in that a predetermined area of an elongate cold-weldable foam web is compressed using a blunt rotary cutter, so that a cold welded seam is formed which secures opposing surfaces of the web to each other at the region of the weld, thereby forming the curved surface.

17. A method as claimed in Claim 16, further characterized in that the web is compressed along at least two parallel longitudinal lines to form at least one cord having a pair of longitudinal welded seams and a circular or oval cross-section.

18. A method as claimed in Claims 16 or 17, further characterized in that the foam is an open cell foam and the curved surface is at least partially coated with a surface layer comprising a pressure sensitive adhesive.

19. A method as claimed in any of Claims 16 to 18, further characterized in that the edge of the blunt rotary cutter has a width of about 0.5 to 1.5 mm.

20. A method of making from a foam web an array of adjacent elongate foam strips that have curved surfaces and are separable characterized in that strips of the foam web along a series of three or more parallel lines are compressed to form the curved surfaces on the web between the lines, and the compressed foam along the parallel lines is welded to cause the welded foam joining adjacent strips to maintain the curvature of the surfaces while enabling manual separation of the strips along the parallel lines.

21. A method as claimed in claim 20, further characterized in that the array is wound on a core so that the strips can later be unwound from the core and manually separated from one another.

22. A method as claimed in Claim 20, further characterized in that the foam is welded using ultrasound or heat.

23. A method as claimed in Claim 20, further characterized in that the foam is welded using cold welding.

24. A method as claimed in Claim 23, further characterized in that the foam web comprises a polyester open cell foam.

Patentansprüche

1. Schaumstoffgegenstand in Form eines länglichen Str ifens mit einer gekrümmten Oberfläche, dadurch gekennzeichnet, daß der Streifen aus einem kaltverschweißbaren Schaum gebildet ist und mindestens einen kaltv rschweißten Saum in seiner Längsrichtung aufweist, welcher die Gestaltung der gekrümmten Oberflä-

che aufrechterhält.

2. Gegenstand nach Anspruch 1, weiter dadurch gekennzeichnet, daß der Gegenstand ein Paar verschweißte Säume umfaßt, einen ovalen oder kreisförmigen Querschnitt besitzt, nah den Schweißsäumen erhöhte Dichte besitzt und eine Länge von mehr als einem Meter hat.

3. Gegenstand nach einem der vorangehenden Ansprüche, weiter dadurch gekennzeichnet, daß der Streifen mindestens teilweise mit einer Schicht eines Klebers überzogen ist.

4. Gegenstand nach einem der vorangehenden Ansprüche, weiter dadurch gekennzeichnet, daß der Streifen ein offenzelliger Schaum in Form einer Farbabdeckdichtung ist, deren Länge und Durchmesser sich zur Anbringung des Streifens zwischen einer Fahrzeugtür und einer Fahrzeugkarosserie eignet.

5. Gegenstand nach Anspruch 1, weiter dadurch gekennzeichnet, daß der Gegenstand ein Paar von gegeneinander geneigten verschweißten Säumen umfaßt, wobei der Streifen eine im allgemeinen kegelförmige Oberfläche hat.

6. Gegenstand nach Anspruch 5, weiter dadurch gekennzeichnet, daß der Streifen die Form eines Ohrenstöpsels hat.

7. Anordnung von benachbarten länglichen parallelen Schaumstoffstreifen, wobei jeder Streifen eine gekrümmte Oberfläche einschließt und die einzelnen Streifen von Hand aus der Anordnung abtrennbar sind, dadurch gekennzeichnet, daß benachbarte Streifen miteinander durch längs verschweißte Säume, die die Krümmung der Oberfläche aufrechterhalten, verbunden sind.

8. Anordnung nach Anspruch 7, weiter dadurch gekennzeichnet, daß mindestens ein Teil der Oberfläche jedes Streifens mit einem druckempfindlichen Kleber überzogen ist.

9. Anordnung nach den Ansprüchen 7 oder 8, weiter dadurch gekennzeichnet, daß der Schaum ein offenzelliger Schaum und kaltverschweißbar ist.

10. Anordnung nach irgendeinem der Ansprüche 7 bis 9, weiter dadurch gekennzeichnet, daß sie eine Länge von mindestens einem Meter hat und die Anordnung in Form einer Rolle aufgewickelt ist.

11. Schaumstoffgegenstand mit gekrümmter Oberfläche, dadurch gekennzeichnet, daß der Schaum ein kaltverschweißbarer Schaum ist, wobei die gekrümmte Oberfläche durch einen kaltverschweißten Saum unter Druck aufrechterhalten wird und der Gegenstand mindestens teilweise mit einer Oberflächenschicht überzogen ist.

12. Schaumstoffgegenstand nach Anspruch 11, weiter dadurch gekennzeichnet, daß der Gegenstand ein offenzelliger Schaum in Form eines länglichen Polsters oder Blocks ist.

13. Schaumstoffgegenstand nach den Ansprüchen 11 oder 12, weiter dadurch gekennzeichnet, daß die Oberflächenschicht einen druckempfindlichen Kleber einschließt.

14. Schaumstoffgegenstand nach irgendeinem der Ansprüche 11 bis 13, weiter dadurch gekennzeichnet, daß die Oberflächenschicht Schleifmittelteilchen und ein Bindemittel enthält.

15. Schaumstoffgegenstand nach Anspruch 14, weiter dadurch gekennzeichnet, daß ein Teil der Oberfläche des Gegenstands mit einer Schleifmittelschicht und eine gegenüberliegende Oberfläche mit einem druckempfindlichen Kleber überzogen ist.

16. Verfahren zur Herstellung eines Schaumstoffgegenstands in Form eines länglichen Streifens mit einer gekrümmten Oberfläche, dadurch gekennzeichnet, daß ein vorher festgelegter Bereich einer länglichen kaltverschweißbaren Schaumstoffbahn unter Verwendung eines stumpfen Rotationsschneidemessers zusammengedrückt wird, so daß ein kaltverschweißter Saum gebildet wird, der entgegengesetzte Oberflächen der Bahn im Bereich der Schweißstelle aneinander bindet, wobei die gekrümmte Oberfläche gebildet wird.

17. Verfahren nach Anspruch 16, weiter dadurch gekennzeichnet, daß die Bahn längs von mindestens zwei parallelen Längslinien zusammengedrückt wird, wobei mindestens ein Cord mit einem Paar von längs verschweißten Säumen und einem kreisförmigen oder ovalen Querschnitt gebildet wird.

18. Verfahren nach den Ansprüchen 16 oder 17, weiter dadurch gekennzeichnet, daß der Schaum ein offenzelliger Schaum ist und daß die gekrümmte Oberfläche mindestens teilweise mit einer Oberflächenschicht, die einen druckempfindlichen Kleber umfaßt, überzogen

ist.

19. Verfahren nach einem der Ansprüche 16 bis 18, weiter dadurch gekennzeichnet, daß die Schneid d s stumpfen Rotationsschneid - messers ein Breite von etwa 0,5 bis 1,5 mm hat.

20. Verfahren zur Herstellung einer Anordnung von benachbarten länglichen Schaumstoffstreifen mit gekrümmten Oberflächen, die voneinander trennbar sind aus einer Schaumstoffbahn, dadurch gekennzeichnet, daß Streifen der Schaumstoffbahn längs einer Reihe von drei oder mehreren parallelen Linien zusammengepreßt werden, wobei die gekrümmten Oberflächen auf der Bahn zwischen den Linien gebildet werden, und der zusammengedrückte Schaumstoff längs der parallelen Linien verschweißt wird, wobei der verschweißte Schaumstoff zusammenhängende benachbarte Streifen bildet, welche die Krümmung der Oberflächen aufrechterhalten, wobei die Trennung der Streifen von Hand längs der parallelen Linien ermöglicht wird.

21. Verfahren nach Anspruch 20, weiter dadurch gekennzeichnet, daß die Anordnung um einen Kern aufgewickelt ist, so daß die Streifen später vom Kern abgewickelt werden und von Hand voneinander getrennt werden können.

22. Verfahren nach Anspruch 20, weiter dadurch gekennzeichnet, daß der Schaumstoff unter Verwendung von Ultraschall oder Wärme verschweißt wird.

23. Verfahren nach Anspruch 20, weiter dadurch gekennzeichnet, daß der Schaumstoff durch Kaltverschweißen verschweißt wird.

24. Verfahren nach Anspruch 23, weiter dadurch gekennzeichnet, daß die Schaumstoffbahn einen offenzelligen Polyesterschaum umfaßt.

Revendications

1. Article en mousse se présentant sous forme d'une bande allongée comportant une surface courbe, caractérisé en ce que la bande est formée d'une mousse soudable à froid et comporte, suivant sa longueur dans le sens longitudinal, au moins une liaison soudée à froid qui maintient la configuration de la surface courbe.

2. Article tel que revendiqué à la revendication 1, caractérisé en outre en ce que l'article comporte deux liaisons soudées, a une section transversale ovale ou circulaire, possède une densité qui augmente au voisinage des liaisons soudées et a une longueur de plus d'un mètre.

3. Article tel que revendiqué à l'une quelconque des revendications précédentes, caractérisé en outre en ce que la bande est au moins partiellement revêtue d'une couche d'adhésif.

4. Article tel que revendiqué à l'une quelconque des revendications précédentes, caractérisé en outre en ce que la bande est une mousse à cellules ouvertes se présentant sous la forme d'une garniture de masquage vis-à-vis de la peinture, dont la longueur et le diamètre sont adaptés pour une disposition de la bande entre une porte de véhicule et une carrosserie de véhicule.

5. Article tel que revendiqué à la revendication 1, caractérisé en outre en ce que l'article comporte deux liaisons soudées inclinées l'une vers l'autre, la bande présentant une surface généralement conique.

6. Article tel que revendiqué à la revendication 5, caractérisé en outre en ce que la bande se présente sous la forme d'un tampon auditif.

7. Un ensemble de bandes de mousse parallèles, allongées et adjacentes, chaque bande présentant une surface courbe et les différentes bandes étant agencées de façon à pouvoir être séparées de l'ensemble à la main, caractérisé en ce que des bandes adjacentes sont réunies entre elles par des liaisons soudées longitudinales qui maintiennent les courbures des surfaces.

8. Ensemble tel que revendiqué à la revendication 7, caractérisé en outre en ce qu'au moins une partie de la surface de chaque bande est revêtue d'une substance adhésive sensible à la pression.

9. Ensemble tel que revendiqué aux revendications 7 ou 8, caractérisé en outre en ce que la mousse est une mousse à cellules ouvertes et soudable à froid.

10. Ensemble tel que revendiqué à l'une quelconque des revendications 7 à 9, caractérisé en outre en ce qu'il a une longueur d'au moins un mètre, l'ensemble étant enroulé sous la forme d'une bobine.

11. Article en mouss présentant une surface courbe, caractérisé en ce que la mousse est

une mousse soudable à froid, la surface courbe est maintenue sous compression au moyen d'une liaison soudée à froid et l'article est au moins partiellement revêtu d'une couche de surface.

12. Article en mousse tel que revendiqué à la revendication 11, caractérisé en outre en ce que l'article est une mousse à cellules ouvertes se présentant sous la forme d'un bloc ou tampon allongé.

13. Article en mousse tel que revendiqué aux revendications 11 ou 12, caractérisé en outre en ce que la couche de surface comprend une substance adhésive sensible à la pression.

14. Article en mousse tel que revendiqué à l'une quelconque des revendications 11 à 13, caractérisé en outre en ce que la couche de surface comprend des particules abrasives et un liant.

15. Article en mousse tel que revendiqué à la revendication 14, caractérisé en outre en ce qu'une partie de la surface de l'article est revêtue d'une couche d'abrasif et une surface opposée est revêtue d'une substance adhésive sensible à la pression.

16. Procédé de production d'un article en mousse se présentant sous la forme d'une bande allongée comportant une surface courbe, caractérisé en ce qu'une zone prédéterminée d'une nappe de mousse allongée et soudable à froid est comprimée en utilisant un couteau rotatif émoussé, d'une façon telle qu'il se forme une liaison soudée à froid qui relie des surfaces opposées de la nappe l'une à l'autre dans la zone de la soudure, ce qui forme la surface courbe.

17. Procédé tel que revendiqué à la revendication 16, caractérisé en outre en ce que la nappe est comprimée le long d'au moins deux lignes longitudinales parallèles de façon à former au moins un cordon comportant deux liaisons soudées longitudinales et une section transversale circulaire ou ovale.

18. Procédé tel que revendiqué aux revendications 16 ou 17, caractérisé en outre en ce que la mousse est une mousse à cellules ouvertes et la surface courbe est au moins partiellement revêtue d'une couche de surface comprenant une substance adhésive sensible à la pression.

19. Procédé tel que revendiqué à l'une quelconque des revendications 16 à 18, caractérisé en outre en ce que le bord du couteau rotatif émoussé a une largeur d'environ 0,5 à 1,5 mm.

20. Procédé de fabrication, à partir d'une nappe de mousse, d'un ensemble d bandes allongées de mousse qui sont adjacentes et ont des surfaces courbes et qui sont agencées de façon à pouvoir être séparées, caractérisé en ce que des bandes de la nappe de mousse sont comprimées le long d'une série de trois lignes parallèles ou davantage de façon à former les surfaces courbes situées sur la nappe entre les lignes et en ce que la mousse comprimée située le long des lignes parallèles est soudée de sorte que la mousse soudée réunisse des bandes adjacentes pour maintenir la courbure des surfaces, tout en permettant une séparation des bandes à la main le long des lignes parallèles.

21. Procédé tel que revendiqué à la revendication 20, caractérisé en outre en ce que l'ensemble est enroulé sur un moyeu, d'une façon telle que les bandes peuvent être ultérieurement déroulées du moyeu et être séparées les unes des autres à la main.

22. Procédé tel que revendiqué à la revendication 20, caractérisé en outre en ce que la mousse est soudée en utilisant des ultra-sons ou de la chaleur.

23. Procédé tel que revendiqué à la revendication 20, caractérisé en outre en ce que la mousse est soudée en utilisant un soudage à froid.

24. Procédé tel que revendiqué à la revendication 23, caractérisé en outre en ce que la nappe de mousse comprend une mousse à cellules ouvertes en polyester.

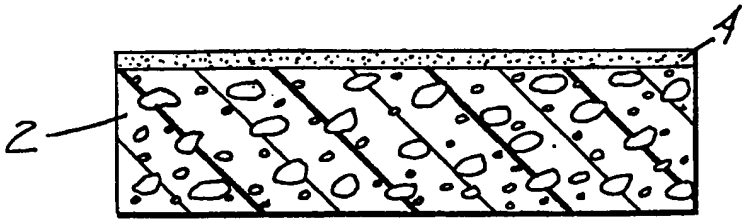

Fig. 1A

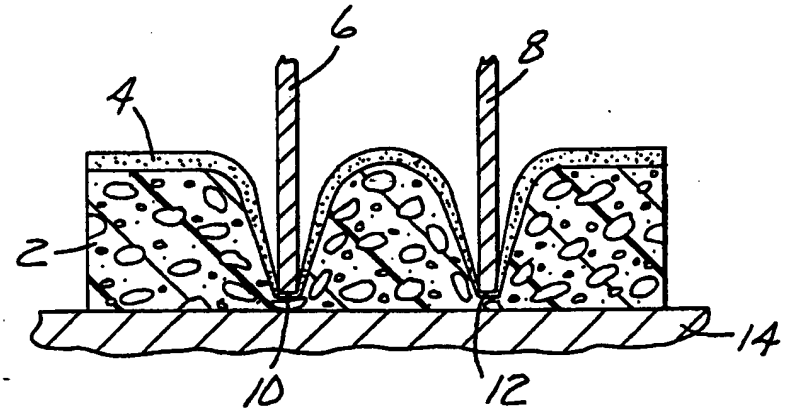

Fig. 1B

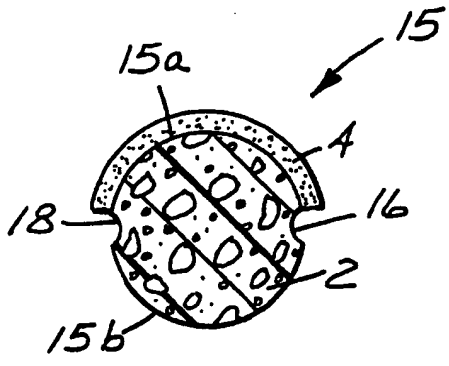

Fig. 1C

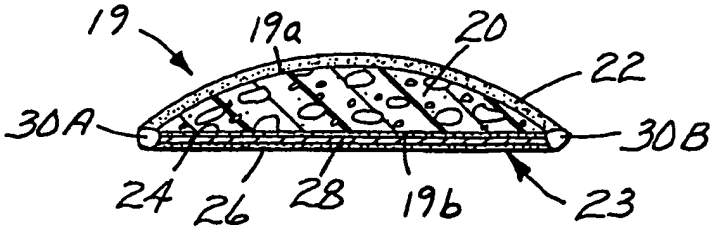

Fig. 2

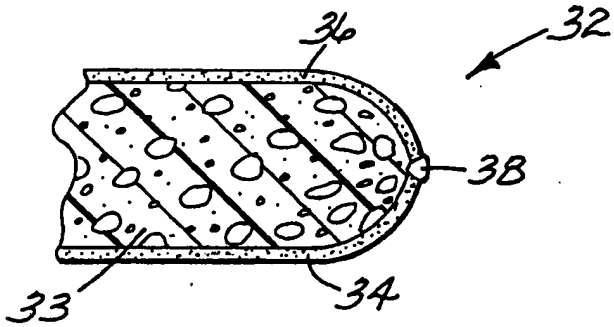

Fig. 3

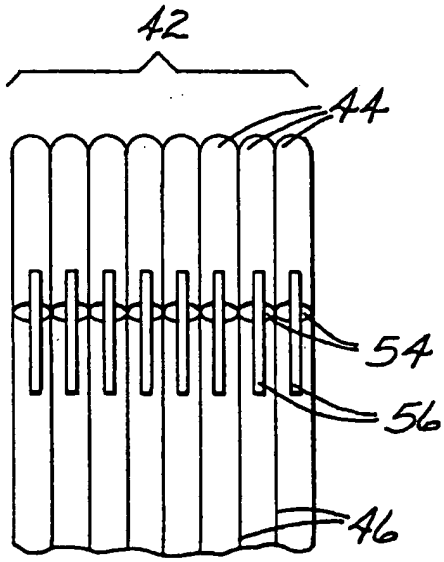

Fig. 6

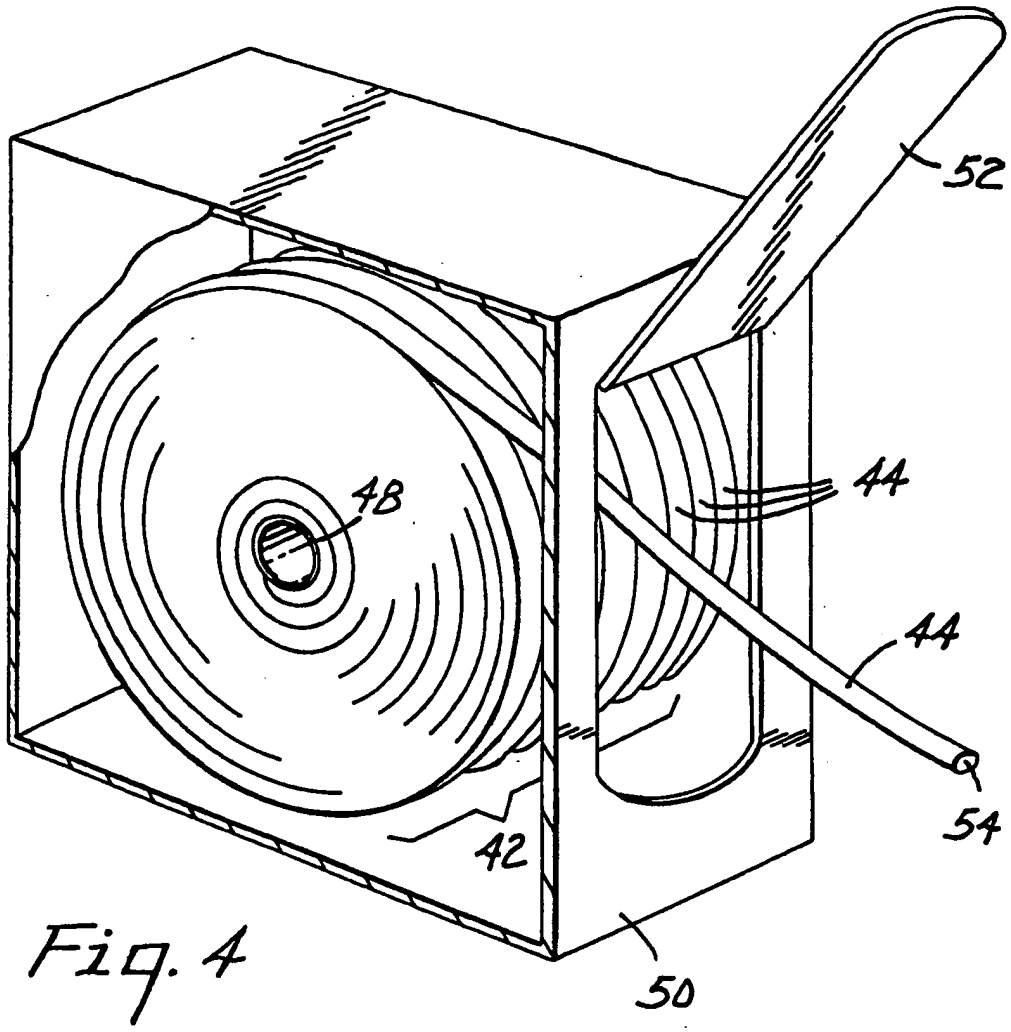

Fig. 4

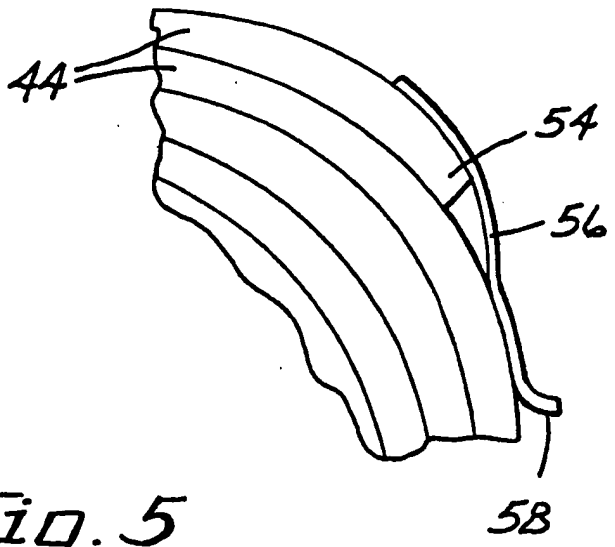

Fig. 5